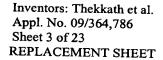


FIG.2A





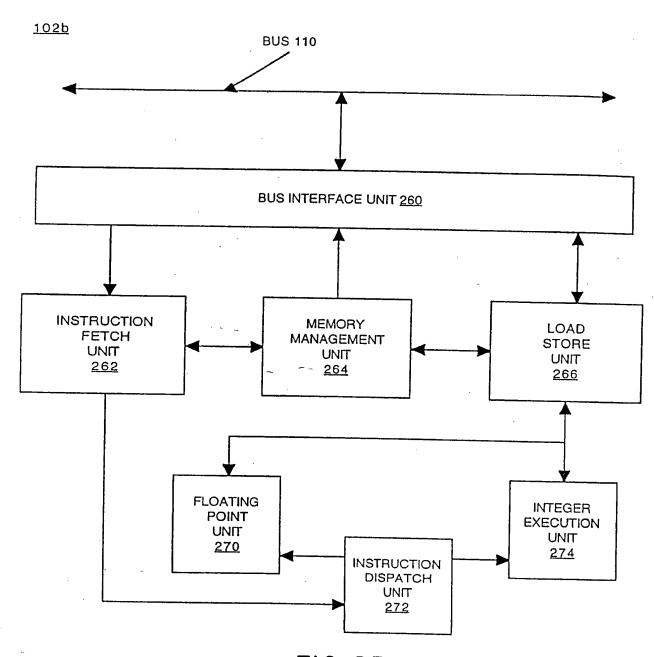
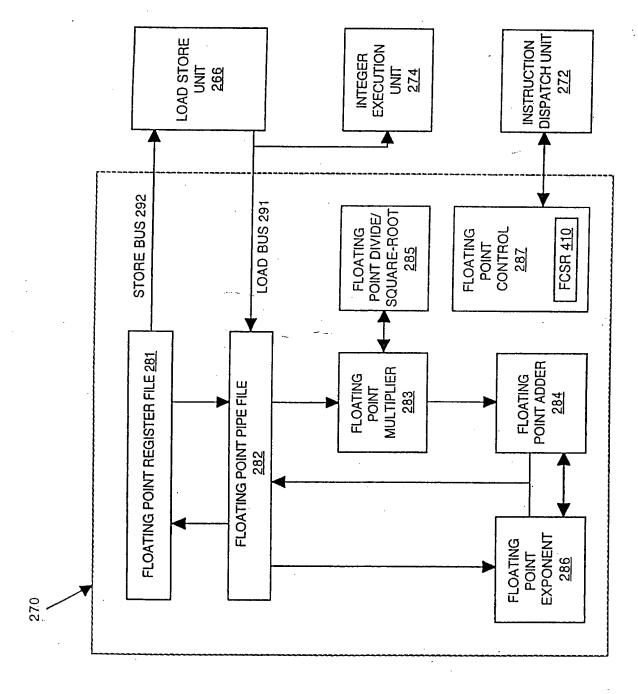


FIG.2B

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Inventors: Thekkath et al. Appl. No. 09/364,786 Sheet 5 of 23 REPLACEMENT SHEET MAY 2 2 2007 5/23 .502 FpFpr 4R2W 32\*64b FPR 504 LATCH 292 522 STORE BUS FpPip < LOAD BUS PACK 291 507, 282 508 506 UNPACK-LOGIC/BYPASS 506 270 FpMul **FpDsq** 286 LATCH LATCH -516 BOOTH ENCODE MUX&CPA 510-DIV/SQRT OF 55 15 MULT ARRAY <u> 283</u> 580 504 504 **LATCH LATCH** 504 516 CPA&MUX DIV/SQRT) 510-LEVEL 2 & 3 OF 55 15 MULT ARRAY LATCH 506--LATCH LATCH 506 EXE PRED 512 506 <u>285</u> 582 54BIŤ CPA 504 >LATCH LATCH -504 EXE PRED 512-FpAdd MUX MUX 284 518 506-**>LATCH** 504-**>LATCH** 584 **PSA MCA** 506->LATCH EXP ADJ 514 583 >LATCH 504 EXP ADJ 514. **519** MUX >LATCH 506 LATCH 506 FIG. 2D

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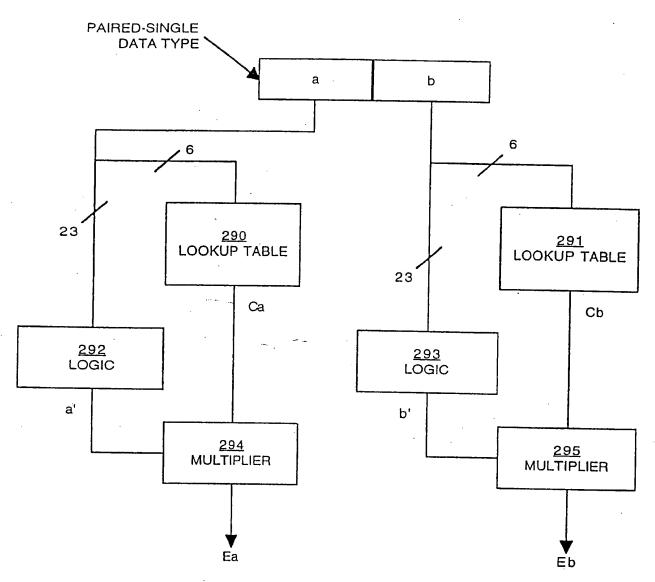
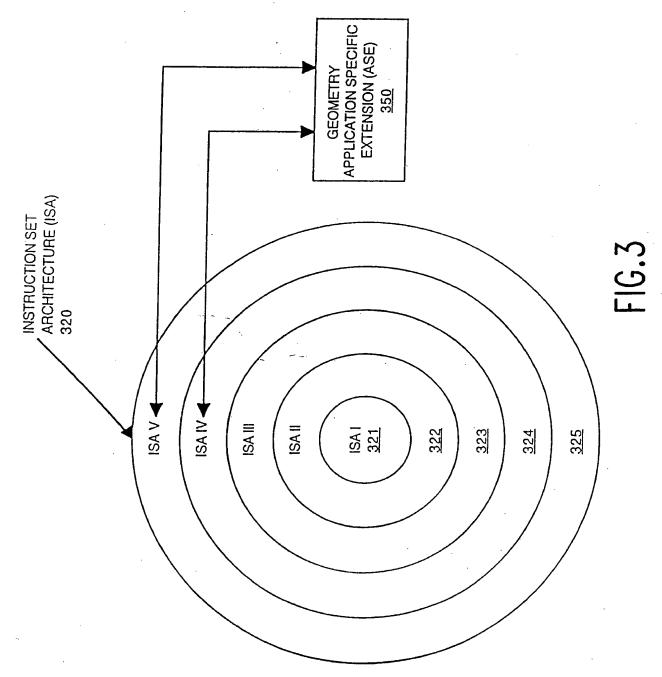


FIG.2E

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2 1 0	FLAGS RIM	5 2	- n 0	4 3 2 1 0
9			Z /	6 5
12 11 7			_ 	
	ENABLES	5	0	6
	<u>6</u>		Z / A	2
			_	12.1
	CAUSE	9-	n 0	14 13
	)		Z   A	17 16 15 14 13 12 11 10
18 17			m	J <del>-</del>
22		5		
23	5	-	0	23
25 24	દ	<del>-</del>		
25			3 2 1	27 26 25
	FCC	7	4	28
			6 5	30 29
_			7 6	31 30

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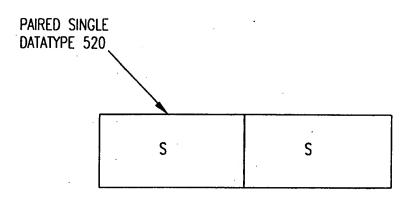


FIG.5

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ADDR 601

31		26 25	21 20	16 15	5 11	10	6 5	0
	COP1 010001	fmt 10110	ft		fs	fd	ADDR.PS 011000	
-	6	5	5	<u> </u>	5	5	6	

FORMAT: ADDR.PS fd, fs, ft

FIG.6A

MULR 602

31		26 25	21 20 1	6 15 11	10 6	5 0
	COP1 010001	fmt 10110	, ft	fs	fd	MULR.PS 011010
	6	5	5	5	5	6

FORMAT: MULR.PS fd, fs, ft

FIG.6B



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RECIP1 603

3	31	26 25	21	20 16	15 11	10	6 5	0
	COP1 010001		fmt	00000	fs	fd	RECIP1.fmt 011101	
•	6		5	5	5	5	6	

FORMAT: RECIP1.S fd, fs RECIP1.D fd, fs RECIP1.PS fd, fs

FIG.6C

RECIP2 <u>604</u>

31		26 25	21 20	16 15	11 10	6 5	0
	COP1 010001	fmt	ft	fs		fd	RECIP2.fmt 011100
	6	5	5	5		5	6

FORMAT: RECIP2.S fd, fs, ft RECIP2.D fd, fs, ft RECIP2.PS fd, fs, ft

FIG.6D



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REPLACEMENT SHEET

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RSQRT1 <u>605</u>

31		26 25	21	20 16	15 11	10	6 5	0
	COP1 010001		fmt	0 00000	fs	fd	RSQRT1.fmt 011110	
•	6		5	5	5	5	6	

FORMAT: RSQRT1.S fd, fs

RSQRT1.D fd, fs RSQRT1.PS fd, fs

FIG.6E

RSQRT2 606

3	31	26 2	5 21	20	16 15	11	10	6 5	0
	COP1 010001		fmt	ft		fs	fd		RSQRT2.fmt 011111
	6		5	5		5	5		6.

FORMAT: RSQRT2.S fd, fs, ft

RSQRT2.D fd, fs, ft

RSQRT2.PS fd, fs, ft

FIG.6F

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CAB	6 <u>607</u>			-			63	35			630	
;	31	26 25	21 20		16 15		11 10 \{ 8	7	6	5 4	3	0
	COP1 010001	fmt		ft	·	fs	СС	0	1	FC 11	cond	
	6	5		5		5	3	1	1	2	4	

FORMAT: CABS.cond.S cc, fs, ft CABS.cond.D cc, fs, ft CABS.cond.PS cc, fs, ft

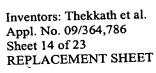
FIG.6G

### CVT.PW.PS 608

3	1	26 25	21	20	16 15	1	1 10	6	5	0
	COP1 010001	fmt 101	(PS) 10	0 00000		fs	f	d	CVT.PW.PS 100100	
	6		 j	5		5		5	6	

FORMAT: CVT.PW.PS fd, fs

FIG.6H





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CVT.PS.PW <u>609</u>

31		26 25	21 2	20	16 15	11	10	6 5		0
-	COP1 010001	fmt (V 10101		00000		fs	fd		CVT.PS.PW 100110	
	6	5		5		5	5	<u> </u>	6	_

FORMAT: CVT.PS.PW fd, fs

FIG.61

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## BC1ANY2F 610

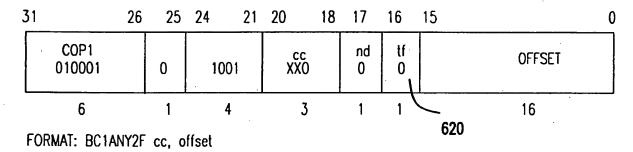


FIG.6J

### BC1ANY2T 611

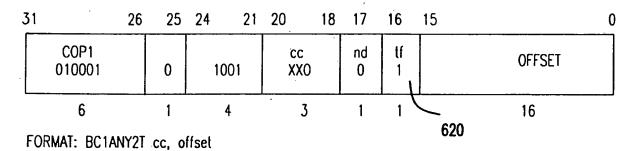
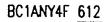


FIG.6K

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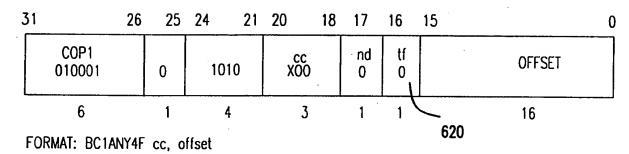


FIG.6L

#### BC1ANY4T 613

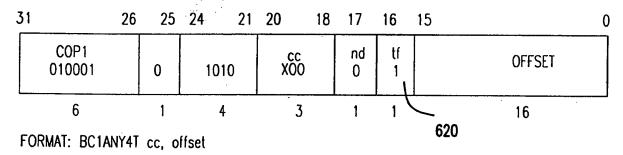
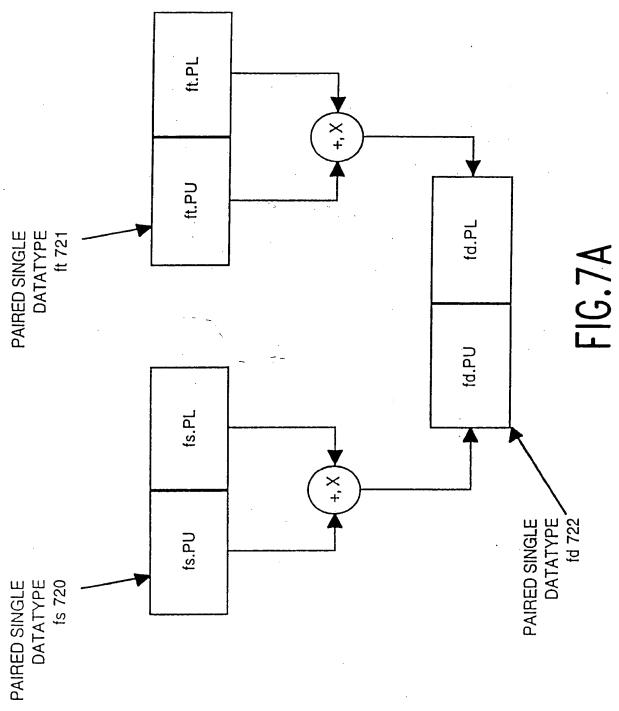


FIG.6M

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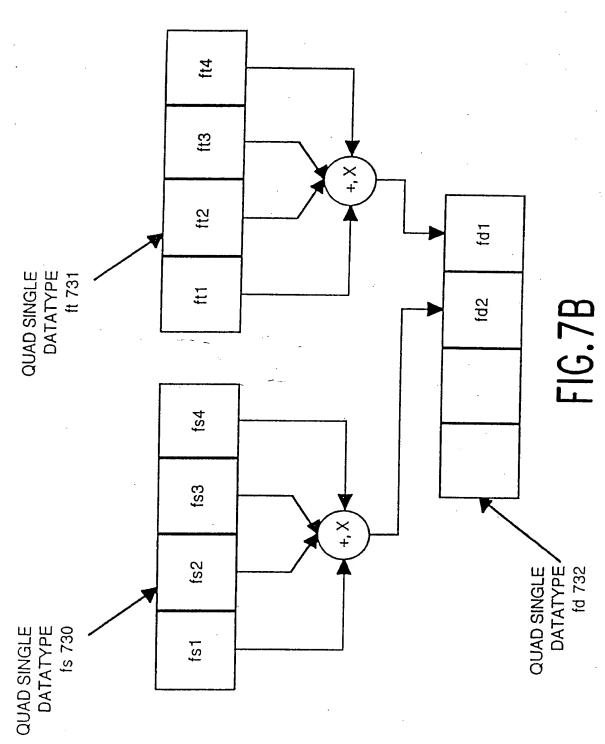




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MADD 801

31	26	25 2	1 20 1	6 15 11	10	6 5 3	2 0
	COP1X 010011	fr	ft	fs	fd	MADD 100	fmt
	6	5	5	5	5	3	3

FORMAT: MADD.S fd, fr, fs, ft MADD.D fd, fr, fs, ft

MADD.PS fd, fr, fs, ft

FIG.8

31		26 25	21 20	16	15	11 10	6 5	0
	COP1 010001	fmt	f	t	fs		fd	MUL 000010
	6	5	-:	5	5		5	6

FORMAT: MUL.S fd, fs, ft MUL.D fd, fs, ft MUL.PS fd, fs, ft

FIG.9

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CVT.PS.S 1001

31		26 25		20	16 15	11	10	6 5	0	
	COP1 010001	1	fmt 0000	ft		fs	fd		CVT.PS 100110	
	6		5	5		5	5		6	

FORMAT: CVT.PS.S fd, fs, .ft

FIG.10



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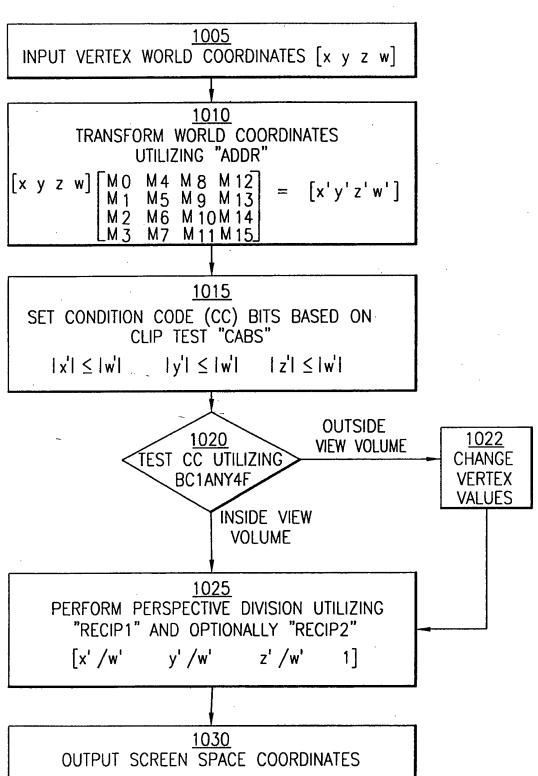
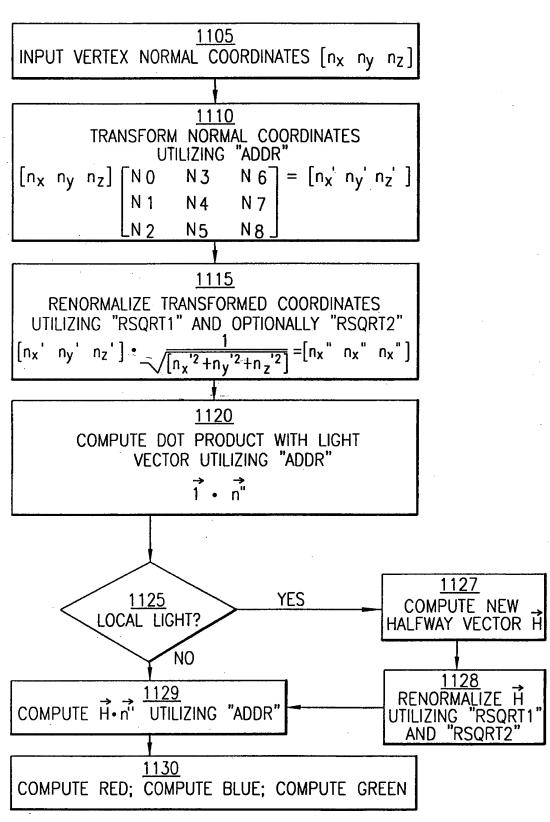


FIG. 11A



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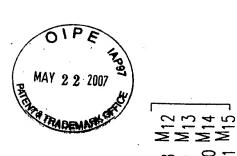
REPLACEMENT SHEET



**FIG. 11B** 

REPLACEMENT SHEET

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M A M	MM 7 7 M 10 M 10 M 10 M 10 M 10 M 10 M 1												M9v+M8x		
OW	FORMAT  AS TWO PAIR SINGLE VALUES  M2  M2  M2  M3	(base) # fp11: w     z ASSUMING L1 CACHE HIT. USE PREFETCH TO ACCOMPLISH THIS	Mgy /     Mgx M13 y     M12 x M1y     M0x			M11 w+Mgy     M10 Z+Mgx	M15 W+M13 y     M14 Z+M12 x	M3w+M1y    M2z+M0x M7w+M5y    M6z+M4x				w'     z' M15 w+M14 Z+M13 y+M12 x     M11 w+M10 Z+M9v+M8x		, ×   ,	
JU MAIRIA IRANSFURM	N PAIR SINGLE FO NEXT VECTOR AS # fp10: y	# fp11: CACHE HIT. US # f514:	# fp15: # fp15: # fp17:	fp13:		# fp14:	# fp15:		fp13:			fp11:	# fp11: I		# fp10: y'
	# fpO-fp7 CONTAIN THE 4x4 MATRIX IN PAIR SINGLE FORMAT Ex, y, z, #BASE CONTAINS THE ADDRESS OF THE NEXT VECTOR AS TWO PAIR SINGLE VALUES 1d fp10, 0(base) # fp10; y 1 1 x	1d fp11, 8(base) # fp10 AVAILABLE HERE ASSUMING L1 (mulps fp14 fp10 fp4	mul.ps fp15, fp10, fp6 mul.ps fp12, fp10, fp0	mul.ps fp13, fp10, fp2	# fp14 AVAILABLE HERE	madd.ps fp14, fp14, fp11, fp5	madd.ps fp15, fp15, fp11, fp7	madd.ps fp12, fp12, fp11, fp1	madd.ps fp13, fp13, fp11, fp3	Ssnop	~	addr.ps fp11, fp15, fp14		# fp12, fp13 AVAILABLE HERE	addr.ps fp10, fp13, fp12

FIG. 12

y' || x' M7w+M6z+M5y+M4x || M3w+M2z+M1y+M0x